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Lessons Learned from the LAC HNS Recurrent Cost Studies of Primary Health Care Services

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EXECUTIVE SUMMARY

Introduction

For much of the past 20 years, Ministries of Health (MOHs) throughout most of Latin America have confronted severe financial crises which have seriously eroded the quantity and quality of services. Compounding this situation is the fact that in many countries, Ministries of Health continue to be administered by physicians who have had little training in management. Resource allocation decisions have been based on the historical budget, with little or no regard for economic or management considerations such as worker incentives, worker or facility productivity, factors influencing the level and composition of the demand for care, the price of inputs, and the opportunity and incentives for substituting different inputs to produce care more economically.

The U. S. Agency for International Development (USAID) has supported numerous efforts to help public and private institutions in developing countries address efficiency issues by developing strategies, methodologies and tools which provide a rational basis for allocating scarce resources. Among these are seven studies of the costs of delivering primary health care services that were conducted in six countries between 1991 and 1993 by the Latin America and Caribbean Health and Nutrition Sustainability (LAC HNS) contract, funded by USAID's Bureau for Latin America and the Caribbean. LAC HNS collaborated with the MOHs in Belize, Bolivia, Guatemala, Nicaragua, Paraguay, and Peru to carry out field studies which attempted to estimate the average cost of key services in order to provide a tool for improving the efficiency with which the respective Ministries of Health deliver primary health care (PHC). The LAC HNS studies were developed to fill an information void in the countries and to provide a regional comparison of unit costs with the hope of identifying the most efficient PHC service delivery strategies that might be promoted in other countries. They also were intended to help refine costing methodology.

This report reviews the methods and findings of the LAC HNS studies and the principal lessons learned in the process. In an effort to help ensure that future studies are designed and implemented in the most cost-effective manner, the report provides guidelines with respect to study design, implementation and presentation of findings.

Study Methodology

The LAC HNS studies all estimated the unit costs of PHC services using budget-based expenditure data. This approach uses information on expenditures of budget allocations as a proxy for actual resources expended in providing PHC in order to reduce the time and resource requirements of the analysis. The Belize and first Peru studies attempted to estimate unit costs of PHC services by utilizing only central level budget data. This approach was rapid and

inexpensive to apply, but proved unreliable for estimating unit costs and was not useful for examining managerial performance and efficiency.

The majority of the LAC HNS studies went beyond central level data and sought to develop unit cost estimates by obtaining data on expenditures at disaggregated levels of the health system. These studies assigned individual facilities as cost centers and attempted to analyze the composition of expenditures within each cost center. The studies estimated the number of specific PHC services provided by each facility and used allocational rules to distribute aggregate costs across facilities and programs.

To arrive at a unit cost estimate, the resources required to produce specific types of PHC services had to be identified. In general, the studies broke down overall costs into four categories: personnel, pharmaceuticals, other direct costs, and indirect costs. This breakdown was probably adequate since personnel and pharmaceuticals normally account for some 90% of the direct costs of PHC. Indirect costs were defined as the share of central, regional and/or area office expenditures which were incurred in support of the delivery of PHC services and thus attributable to the cost of PHC services.

Since personnel costs generally represent the largest part of total service delivery costs, estimating the amount of time each type of personnel spends providing each PHC service and converting that time to monetary amounts was the most important costing procedure in the studies.

Several different methods were used to measure the amount of facility-level personnel time devoted to each PHC service. In Paraguay, existing MOH reports on the amount of time employees spend providing particular types of services served as the basis for estimating personnel costs. In Bolivia and Nicaragua, all MOH employees in each of the study facilities were asked to estimate the proportion of their time that they spent, on average, providing each of several types of PHC services. In the Guatemala study and the second Peru study, regional and central office officials were asked to estimate the amount of time each type of MOH personnel category in each type of facility devoted to providing each type of PHC service.

None of the studies could directly identify the precise amount of "other" (i.e., non-personnel and non-drug) service delivery expenditures made by the MOH. The studies which developed facility-based cost estimates all assumed that the distribution of other direct costs by PHC service was directly proportional to that of personnel expenditures. Similarly, in most of the studies, the total indirect costs of providing PHC were assigned to individual facilities on the basis of their share of total PHC personnel costs.

Lessons Learned on Study Design and Costing Methodology

- ▶ In order to determine the appropriate strategy and detail required for cost studies, it is critical to define *a priori* what it is that the study hopes to accomplish.

- ▶ To guide study design, the audience for whom the study is intended and their explicit managerial domain should be clearly identified.
- ▶ The costing methodology selected must be based on the study's objectives, target audience and resources available. Regardless of the approach selected, it is important to recognize and to explicitly identify and discuss the shortcomings of the method chosen and their implications in interpreting the findings of the cost analysis.
- ▶ The study design should identify the role and significance of critical contextual factors; in the event of significant changes in these factors during the study period which eliminate the basis for comparison, the design should be modified accordingly.
- ▶ The study design should include examination of resource allocation processes as well as outcome measures like average unit costs.
- ▶ In making comparisons between facilities, those studied should be comparable in terms of the number and type of staff, the complexity of services offered, and preferably the size of the population served.
- ▶ In order to reduce the volume of data, recurrent cost studies should focus primarily on health centers and/or facilities of higher complexity. Health posts should be added only when sufficient capacity exists to gather and process the data rapidly.
- ▶ A single facility of each type should be identified as an example of a well-supplied and well-functioning facility to serve as a benchmark against which to measure the performance of other study facilities.
- ▶ Where they exist, rely upon existing MOH resource allocation rules rather than devising substitutes; at the same time, the study should assess the impact of these rules on actual and potential efficiency.
- ▶ An MOH-specific price index should be constructed and used to derive "real" expenditure levels rather than relying on the overall consumer price index.
- ▶ The study should perform sensitivity analysis to assess the significance of key assumptions.
- ▶ Data should be summarized and presented graphically to attract the interest of the people responsible for their utilization. Technical jargon should be avoided. To be most useful, recurrent cost studies should be planned so as to minimize the time span between data collection and presentation of results.

- ▶ The presentation of findings should focus on identifying which cost variations are significant and who can do what about them.
- ▶ Efforts should be made to transfer the technology of the cost studies to MOH personnel to enable its institutionalization as a sustainable management tool. Follow-on technical assistance to the study itself is probably necessary to develop a simplified costing approach which can be used routinely by MOH personnel without external assistance.

Conclusions

The LAC HNS primary health care recurrent cost studies were an experimental effort to draw attention to efficiency concerns by quantifying the costs of delivering PHC services in a select group of Latin American countries. As such, they were a first generation attempt at refining a practical approach for costing public sector PHC services. The methodological lessons garnered from this experience are thus perhaps as important as the cost findings themselves.

The primary limitations of the methodology applied in the LAC HNS studies were that, by attempting to provide a broad picture of PHC costs and suggest areas of inefficiency, the studies did not, in most cases, generate enough specific information that would enable program managers to take concrete actions to improve the efficiency of service delivery. The exceptions were the country studies in Guatemala, Nicaragua and Paraguay, all of which focused considerable attention on a sub-national level (in Guatemala, the health area level; in Nicaragua, the local health system or SILAIS level; in Paraguay, the regional level) and worked with local officials to interpret the findings and suggest implications for regional or area management decisions.

In the Guatemala Sololá health area, the SILAIS level in Nicaragua and in the two regions studied in Paraguay, the LAC HNS study team worked with local officials in using the cost information for budgeting and planning purposes. The LAC HNS experience showed that it is not enough to present data to sensitize central level officials to cost issues, but rather that such information can best be used at operational levels. Moreover, follow-up to the presentation of data is essential to assist local officials in putting the information to practical use.

The LAC HNS studies also demonstrated the difficulty of making international comparisons of unit costs of specific primary care services. One of the overall objectives of the studies was to develop such a comparison which would produce, among other things, specific suggestions for minimal PHC funding levels, the optimal mix of health care services, and methods for enhancing the efficiency with which different, specific PHC services are delivered. Unfortunately, differences in the countries' definitions of PHC and availability of expenditure data, and the variations in how the step-down costing approach could be applied in each country precluded being able to do so.

The World Bank is now promoting the use of recurrent cost studies as a step toward costing packages of basic health services. The LAC HNS experience suggests that such studies are most useful if kept focused on a few limited objectives, with immediate applications planned for the data generated and follow-up technical assistance to help national and local officials interpret and apply the findings. The studies also underscore the importance of examining the contextual factors and resource allocation decision-making processes which largely determine variations in costs.

I. INTRODUCTION

A. Background

For much of the past 20 years, the Ministries of Health (MOHs) throughout most of Latin America have been confronted by a severe and protracted financial crisis which has resulted in serious erosion in the quantity and quality of health services. In most countries, the traditional MOH constituency--the vast majority of the national population--has increasingly opted to complement public sector services with private sector care, or has forsaken wholesale the MOH, thereby nurturing the growth of the private sector and generating a type of *de facto* privatization.

Two different types of approaches to easing the financial constraint have been developed and pursued with varying degrees of intensity and success: *mobilizing additional resources* and *improving efficiency*. The mobilization of additional resources attempts to address the resource constraint by searching for means to augment the resources a Ministry of Health has at its disposal, such as implementing cost recovery measures. The strategy of improving efficiency, on the other hand, strives to use existing resources more effectively.

Efficiency is an economic concept that is concerned with the quantity and mix of resources that are being used to achieve a particular goal. There are two types of efficiency, allocative and operational. *Allocative efficiency* is concerned with selecting the best mix of goods and services to produce in order to achieve a particular goal. It is often measured as cost-effectiveness, that is, the net gain from a particular intervention in relation to the cost. In the health sector, a measure of cost-effectiveness might be the cost-per-death averted or per-case of illness prevented.

Operational efficiency, on the other hand, addresses how efficiently each individual good or service is produced. The single best measure of operational efficiency is average unit cost--the value of resources required, on average, to produce a single unit of a particular good or service. Thus while setting priorities among alternative interventions for funding decisions would be an issue of allocative efficiency, the concern for operational efficiency would seek the most efficient way (i.e., least cost to produce the desired output) to deliver a particular intervention.

Traditionally, Latin American Ministries of Health have been administered by physicians who have had little training in management. Resource allocation decisions have been based on the historical budget, with little or no regard for economic or management considerations such as worker incentives, worker or facility productivity, factors influencing the level and composition of the demand for care, the price of inputs, the opportunity and incentives for substituting different inputs to produce care more economically, or the prices charged for different types of services at different types of facilities or by alternative, non-MOH sources of care.

The U. S. Agency for International Development (USAID) has supported numerous efforts to help public and private institutions in developing countries address efficiency issues by developing strategies, methodologies and tools which provide a rational basis for allocating scarce resources. Among these are seven studies of the costs of delivering primary health care

services that were conducted in six countries between 1991 and 1993 by the Latin America and Caribbean Health and Nutrition Sustainability (LAC HNS) contract, funded by USAID's Bureau for Latin America and the Caribbean. The seven LAC HNS cost studies estimated the average cost of key services in order to provide a tool for improving the efficiency with which the respective Ministries of Health deliver primary health care.

B. The Rationale for Cost Analysis of Primary Health Care

Primary health care (PHC) relative to secondary and tertiary care (especially hospital-based) has been widely promoted by international agencies since the late 1970s as a more cost-effective strategy for improving the health status of a country's population. Increasing the relative financing level of primary health care services has been advocated by donor agencies as the critical strategy for improving the allocative efficiency of Ministries of Health in most developing nations.

Yet, detailed information about the costs of delivering PHC services has not been widely available in most countries. Such information is critical for addressing both allocative and operational efficiency questions—how to use scarce resources most effectively and how to improve service operations. The LAC HNS studies were developed to fill an information void in the countries and to provide a regional comparison of unit costs with the hope of identifying the most efficient PHC service delivery strategies that might be promoted in other countries.

Unit cost estimates have other uses, as well. They constitute a tool which MOHs can use to gain credibility with their Ministries of Finance in their political battles to secure more adequate central government resources by providing the MOHs with the wherewithal to much more precisely and more proactively articulate their resource requirements. Unit cost estimates can provide an alternative to relying on simple-minded extrapolations to quantify estimated budget requirements. Furthermore, as many countries are now exploring alternative financing mechanisms which involve user fees or even pre-paid capitation schemes, unit cost information is needed to help define appropriate fee levels and define the costs of a specified package of services.

Unit cost studies can also make an important contribution by pushing MOH personnel to think about tradeoffs and other economic issues involved in providing health care and operating a large, highly structured, hierarchical organization. Thus the development and application of unit cost analysis is an important tool for sensitizing MOH decisionmakers to critical economic issues confronted at the various levels of the MOH, and helping them to begin to implement some fundamental changes in the thinking and mode of operation of the MOH.

While cost information is undoubtedly useful, cost studies themselves can be expensive and very time-consuming to perform since most MOHs do not have financial accounting systems in place which readily yield cost data. In the absence of such data, studies can go to great lengths to generate reasonable estimates of costs. If not carefully focussed on key information needed for specific decision-making purposes, cost studies can result in large data collection and analysis

exercises which produce interesting but not immediately applicable results. As will be discussed later in this report, the most critical decisions in developing a cost study are to define the scope of the analysis, the audience for its results, and how the information generated will be used.

C. Purpose and Scope of this Paper

This paper describes the methodology and results of the seven LAC HNS cost studies in order to derive lessons for further work in primary health care cost analysis. The report describes the general methodological approach followed in the LAC HNS studies and how it was modified to fit the particular situation and concerns of the MOH in each study country. The results obtained for unit costs and cost composition are then presented. The remainder of the paper draws lessons from the collective experience of the LAC HNS studies with respect to cost study design, implementation and presentation of findings.

This report is not intended to provide a step-by-step guide to conducting PHC cost analysis. Excellent examples of such guides already exist (such as *Cost Analysis in Primary Health Care*, World Health Organization, 1994) and should be consulted by those who are interested in carrying out cost studies. Instead, the present document attempts to provide a practical discussion of the key issues and choices involved in developing meaningful recurrent cost studies which will help decision-makers make better use of their resources. It is hoped that the experience of the LAC HNS studies will help to ensure that future studies are designed and implemented in the most cost-effective manner possible which maximizes the utility of the findings.

II. DESCRIPTION OF THE LAC HNS STUDIES

A. Overview

Between 1991 and 1993 the LAC HNS contract implemented by University Research Corporation and International Science and Technology Institute carried out seven studies of the recurrent costs of primary health care services delivered by the Ministry of Health in each of six countries of the Latin America and Caribbean region. Two studies were conducted in Peru, and one was conducted in each of the countries of Belize, Bolivia, Guatemala, Nicaragua and Paraguay. The stated purpose of each of the studies was to try to ease the MOH's financial constraints by improving the efficiency of its delivery of PHC services.

The LAC HNS studies analyzed only the short-run recurrent costs of providing PHC, excluding capital expenditures and amortization of durable equipment and buildings. The length of time analyzed varied by study, ranging from a three-month period to one full year. Table 1 outlines the scope of the studies in terms of geographic areas included and the period of time studied.

TABLE 1
LAC HNS PHC Recurrent Cost Studies

Country	Region/Area	Time Period Covered	Number of Facilities	
			Centers	Posts
Belize	National	4/1990-3/1991		
Bolivia	Altiplano Sur	10-12/1990	1	5
		7-9/1991	1	5
	Valles Cruceños	10-12/1990	4	9
		7-9/1991	4	9
Guatemala	National Sololá	1989		
		1989	7	29
Peru	National Lambayeque	1990		
		10-12/1990	3	
	Lima Sur	10-12/1991	3	
		10-12/1990	3	3
		10-12/1991	3	3
Nicaragua	Granada	1-9/1991	5	7
	León	1-9/1991	5	8
	Matagalpa	1-6/1992	3	7
	Jinotega	1-6/1992	3	7
	Managua "A"	1-6/1992	3	5
	Managua "B"	1-6/1992	2	
Paraguay	Cordillera Type 1	1-6/1992	9	10
	Cordillera Type 2	1-6/1992	7	4
	Paraguarí Type 1	1-6/1992	5	12
	Paraguarí Type 2	1-6/1992	10	9

The studies were experimental in the sense that their structure frequently varied. Furthermore, in addition to the estimation of unit cost data, each study also pursued a series of secondary objectives which varied from country to country. The Belize and first Peru studies attempted to use national budget data to arrive at unit cost estimates which was found to be an unreliable procedure; and in the case of Peru, a second study focusing on a sample of PHC facilities was carried out to corroborate the results of the first. This second study also attempted to compare costs for the same facilities during two different time periods.

The Guatemala study had a national focus and sought to distribute aggregate PHC-related costs among all primary care facilities. In addition, the Guatemala study included an in-depth analysis

of recurrent costs in one health area. This methodology was later extended to three other health areas in a follow-on study. The Paraguay study represented more typical study structure which compared two or more regions within the same country. The Paraguay study also examined the recurrent costs of the MOH hospital in each region. Comparisons were sometimes complicated by the use of data from different time periods.

In all of the studies, the design was developed by LAC HNS staff, and local and international consultants were contracted to obtain the data. LAC HNS subcontractor The Development Group, Inc. provided personnel for several of the country studies. Analysis was generally done by LAC HNS staff or contracted personnel. Because of the massive amounts of data obtained in some of the studies and problems with data validity, there was generally a gap of many months prior to submission of the final report. This delay decreased to some degree the utility of the studies themselves.

Perhaps in part due to the enormous effort required to collect and analyze the data, in most of the country studies, relatively less attention was given to the presentation and interpretation of the data with local authorities. This detracted from the value of the studies. In Guatemala and Paraguay, however, national workshops were organized to present the results, as well as local workshops in the areas where data were collected. Unfortunately, following these workshops, there was no systematic follow-up of the use of the findings by national decision-makers.

B. The General Methodological Approach Used in the LAC HNS Studies

1. Definition of Primary Health Care in the LAC HNS Studies

The LAC HNS studies defined the universe of Ministry of Health-provided primary health care as all services provided by MOH health posts and health centers. In each country, the specific primary health care activities were locally defined and thus varied by study. Most commonly, the PHC cost centers—i.e., the specific PHC activities for which the study developed unit cost estimates—were established by simply adopting the existing taxonomy of services contained in the Ministry of Health's activity reporting system.

2. Overview of the Step-Down Costing Approach

There are three basic approaches for estimating costs: 1) measuring the actual quantities of all resources used to produce a particular good or service and the prices of those resources; 2) relying upon readily available accounting-based data to measure the value of resources used to produce a good or service; and 3) applying statistical techniques to estimate a cost function which describes the relationship between the quantity of output and the cost of producing that output. As discussed in Table 2, the approaches are quite different in terms of their data requirements, resources needed to carry them out, and the precision of their results.

TABLE 2

A Comparative Overview of the Main Costing Methodologies

Studies of Actual Costs: Directly observing and recording the quantities of resources actually used to produce a good or service and valuing those resources at market prices is the most precise method for measuring the cost of producing a good or service. Whether the direct measurement is been done by a third party or by a single MOH employee or by all staff persons working at a particular facility, however, such studies involve a great deal of time and effort, and are disruptive of the normal functioning of a health facility. The cost of these studies is generally prohibitive, even for only a sample of facilities. As a result, the direct measurement of costs has generally been limited to a relatively small number of studies which have attempted to quantify the amount of time devoted to distinct activities (cost centers) by each staff person of a particular facility, while ignoring the use of all other inputs (drugs and materials). These studies, commonly referred to as time-motion studies, are generally concerned not directly with the personnel costs of providing care, but with issues of how to improve the organization of services (in order to streamline service delivery from both the staffing time perspective, as well as from the patient-flow perspective) and the identification of minimal staffing requirements.

Accounting-based Cost Studies: Accounting-based analyses rely on information about expenditures against budget line items as a proxy for actual costs of goods and services required to produce a specific output. Such budget-based studies usually estimate costs at a highly aggregated level, defining cost centers for MOH services in a very general manner, e.g., the average cost of an outpatient visit or of a hospital admission for the MOH as a whole. A second type of budget-based study starts with the same basic approach, but involves more detailed and specific cost centers, and thus entails considerably more work. This technique involves the development of facility-specific costs of specified services using allocational rules to distribute aggregate costs across facilities, departments, and functions to the specific service cost centers. The development of these estimates requires disaggregating budget expenditures data down to the individual facility level and from there, breaking them down to the specific services of interest. Each of these top-down disaggregation steps—hence the name of the approach, "step-down" costing—involves making judgments about the proportion of each type of input used to produce the service of interest as opposed to other types of activities or services.

Statistical Cost Studies: Statistical cost studies identify final and intermediate products and statistically relate these outputs to total costs, or more frequently expenditures. This technique requires a very large number of observations to validly and reliably estimate a systematic relationship between outputs and costs. While accounting-based studies are able to provide only a single (or point) estimate of the total costs of providing a particular level and mix of output, statistical cost empirically determine the relationships between changing output levels (i.e., the quantities of services provided, or scale) and total, average and marginal costs. As a result, the statistical model is much more useful for planning purposes and for gaining greater insights into what is likely to happen to costs as output levels change.

The LAC HNS studies all estimated the unit costs of PHC services following the second approach—using accounting-based analysis that relies on expenditure data. This approach uses expenditures of budget allocations as a proxy for actual resources expended in providing PHC in order to reduce the time and resource requirements of the study. In contrast to direct measurement of actual resource use, which is inherently a bottom-up approach, budget-based studies are top-down in approach: they use aggregate data to estimate resource use throughout a system.

Typically, the structure of an MOH budget consists of categories of expenditures developed by the Ministry of Finance for purposes of accountability (i.e., to track the use of public treasury funds). For this reason, the specific budget line items are commonly uniform across all central government ministries and are not easily linked with specific Ministry of Health programs or services. There is, for example, no Ministry of Finance (and thus no MOH) budgetary line item for primary health care. As such, budget-based analyses are not particularly useful for quantifying the costs of specific MOH programs or services, such as PHC.

Moreover, the budget lines contain monetary totals for the entire MOH organization and are not broken down by facility, region, or other sub-national grouping. Budget-based analyses, therefore, usually estimate costs at a highly aggregated level, defining cost centers in a very general manner for the entire MOH organization (e.g., the overall MOH average cost of an undifferentiated outpatient consultation).

Since this technique develops cost estimates of services provided by the entire MOH, it is not particularly useful for examining managerial performance and efficiency, except at the national level. This was the approach taken in the two most general and highly aggregated LAC HNS studies, the first Peru study and the Belize study.

Most of the LAC HNS studies used a variation on this approach which involved the development of more detailed cost centers, as well as disaggregated analysis of the composition of expenditures, and thus entailed considerably more work. Each study developed estimates of facility-specific costs of selected PHC services using allocational rules to distribute aggregate costs across facilities, departments, and functions to the specific PHC service cost centers. The development of these estimates required disaggregating budget expenditure data down to the individual facility level and from there, allocating them to the specific services of interest. Each of these top-down disaggregation steps involved making two sets of judgments. First, the study had to determine the proportion of each type of input that was used to produce PHC, as opposed to other types of activities or services. Second, it had to determine how PHC inputs and expenditures were used to produce specific types of PHC services.

The most important disaggregation procedure in these studies involved the determination of the amount of time each type of personnel spends providing each type of primary health care service. Other important steps involved determining the share of central office and regional office expenditures which were made in support of PHC services (which were labeled "indirect" or "overhead" costs).

The costing methodology that was applied in the LAC HNS studies was actually a type of hybrid accounting-based technique that combined elements of more traditional, highly aggregated, national budget-based expenditures analysis, along with a more facility-specific type of standard step-down cost analysis. In addition, some of the studies, indirectly measured the actual level of some of the resources used to provide PHC services. (Most commonly this approach was taken with drugs, or a portion of the drugs, e.g., vaccines, and/or to a portion of the "other direct costs.")

3. Country-Specific Methods Used to Step-Down Costs

a. Personnel

Since personnel costs generally represent 50 to 70 percent or more of the total costs of producing primary health care services, determining personnel costs was also the single most important disaggregation and weighing procedure in the LAC HNS studies. It generally involved estimating the amount of time each type of personnel spends providing each type of primary health care service and converting that time to monetary amounts using salary figures.

The LAC HNS studies used several different methods to measure the amount of facility-level personnel time devoted to each type of PHC service. In Paraguay, MOH employees have been required for many years to routinely report the amount of time they spend providing particular types of services. These reports served as the basis for estimating personnel costs in the Paraguay study. Since none of the MOHs in the other study countries had a similar type of reporting requirement, it was necessary to develop a means by which to estimate time use in these countries. In Bolivia and Nicaragua, all MOH employees in each of the study facilities were asked to estimate the proportion of their time that they spent, on average, providing each of several types of PHC services.

In Belize, a less formal and rigorous interview method was relied upon. Average personnel time inputs were estimated on the basis of interviews of persons working in PHC facilities (primarily nurses). In the Guatemala study and the second Peru study, regional and central office officials were asked to estimate the amount of time each type of MOH personnel category in each type of facility devoted to providing each type of primary health care service.

Regular reports on personnel activities are probably more accurate than occasional facility interviews, but are more costly in terms of reporting and processing time and may not be significantly more accurate. Interviews with service providers themselves provided more accurate information than general estimates by supervisory personnel and have the advantage of better reflecting the activities in individual facilities.

One problem in estimating personnel time is how to incorporate "down time"—time when personnel is not actively engaged in delivering services. Excessive down time may be due to a low demand for services, or because staff is not physically present although contracted for. The latter is typically a hidden cost and is probably best treated in the manner carried out in the

LAC HNS studies: divide 100% of the available time into the various activities, which automatically prorates the non-assistance time into all of the activities. In this case, the costs will be reasonably accurate, although the activities per hour may be quite incorrect.

In most of the studies, the data collection teams attempted to use the actual salaries and benefits of each staff member but often encountered reluctance on the part of individuals to release this information. A much simpler procedure could be adopted which protects confidentiality and also helps to smooth out differences between personnel costs in different facilities due simply to longevity of the personnel: a standard personnel cost including both salary and benefits should be calculated for each category of personnel. The time of each staff member actually working in a facility should then be costed according to that standard.

b. Drugs

Ideally, existing logistical and/or accounting systems would yield the value of pharmaceuticals distributed to each site. While this is not the same as the value of the pharmaceuticals dispensed, it is normally a sufficiently close approximation. Unfortunately, because such systems are not yet commonplace, the LAC HNS studies experimented with various alternative mechanisms.

In the absence of adequate records, the study teams for Bolivia and Nicaragua assumed that the drugs dispensed corresponded to MOH norms for the various diseases treated. This probably overestimated the drugs actually dispensed. In Belize, the fact that the analysis was done of the MOH as a whole meant that there was considerably less work involved in quantifying expenditures on drugs. Central warehouse data on the value of new orders (for all MOH facilities) were the basis of the estimates.

In Guatemala, drug distribution is done primarily on a "kit" basis, with each health post receiving exactly the same amount of drugs. This is administratively simple and facilitates cost calculations, but is not necessarily the most cost-effective way to distribute drugs. To get unit costs of PHC services in Guatemala, the LAC HNS study team, following the advice of local authorities, distributed the value of the medicines received by all facilities to specific categories of PHC services. By this rule, just one of the eight PHC services, "treatments" was assigned 92.5 percent of the total value of medicines, with acute respiratory illness, oral rehydration therapy and immunizations accounting for the remainder (3.0 percent, 2.5 percent and 2.0 percent, respectively). This was a rather crude mechanism for estimating drug use. It also ignores the cost of vaccines, which in many cases were donated.

In Paraguay, drugs and materials were combined into a single expenditure category. Regional MOH officials estimated the share of the total value of central government-funded medicines and materials that went to PHC facilities in their region. To this figure were added expenditures made by the regional hospital on PHC-related laboratory analyses. This sum was then allocated to the individual facilities in the region in direct proportion to the level of consultations, hospitalizations, and minor surgery and curative treatments they provided.

This procedure did not account for the total value of PHC drugs and materials in Paraguay, however. All of the supplies for the immunization and family planning programs used in the two study regions of Paraguay during the period came from international agencies. In the absence of information about either the cost or the quantities of these materials that were used to provide immunizations and family planning services in the two study regions, an input requirements approach was taken. The quantity and cost of the supplies required to provide each of the principal types of vaccination and family planning services provided were estimated. Then, based on the quantity and mix of services provided, an estimate of the total value of inputs was developed. The estimated total regional PHC drugs and materials expenditures was the sum of these three sources: the estimated value of the donor-provided supplies, the estimated share of the region's total central government-funded drugs and materials which was dedicated to PHC, and the estimated value of the regional hospital's laboratory expenditures dedicated to performing PHC analyses.

Of all the methods used in the LAC HNS studies, the most practical way of estimating drug use was to apply treatment norms to the volume of specific cases treated at that facility. This has the advantage of automatically separating drug utilization into service categories. It may be refined by prorating the treatment norms by estimated compliance.

c. Other Direct Costs

None of the six countries studied could directly identify the precise amount of "other" (i.e., non-personnel and non-drug) expenditures made by the MOH. The methods used to quantify the total amount of "other" direct costs and the proportion of that total used specifically for PHC services varied substantially among the seven studies, reflecting primarily a combination of the different organizational structures of the different MOHs, together with systematic variation in the types, quality and level of detailed records available.

The five studies which developed facility-specific-based cost estimates all assumed that the distribution of "other" expenditures by PHC service was directly proportional to that of personnel expenditures. While this is clearly not an accurate estimate, the error is at least minimized by the fact that other direct costs usually represent only about 10% of the total cost, such that even a gross discrepancy would not greatly affect the unit costs.

d. Indirect Costs

Indirect or overhead costs are other costs incurred by the MOH in providing services which are not directly attributable to any particular service. They include the costs of maintaining the supervisory levels of the system, as well as maintaining support systems such as logistics, training, technical norms development, and administrative systems. Since the LAC HNS studies were interested in estimating only the costs of PHC, they also had to develop a means for apportioning total MOH indirect costs between PHC and non-PHC services.

Given the different types of MOH organizational structures in the LAC HNS study countries, it was inevitable that the studies capture different levels and types of costs in their indirect cost estimates. That, however, was not the only source of variation in the methods and magnitudes of the indirect cost estimates.

The ways in which indirect costs were estimated in the LAC HNS studies were another source of variation: not all of the studies included all of the supra-facility level indirect costs. The Guatemala and Nicaragua studies, for instance, included only the costs of the regional office and not those of the central office. In contrast, in Paraguay, the indirect costs included portions of both the regional office and the central office costs.

The Belizean MOH has no regional office structure. The Belize study's indirect costs, therefore, included only the PHC share of the central office. In the Belize study, it was estimated that 30 percent of total non-administrative service delivery MOH expenditures were made on PHC; the same proportion of total MOH administrative costs was attributed to PHC. At the other extreme was the Bolivia study. It included only a portion of the district level MOH offices' total expenditures: only the district office costs for the personnel who supervise PHC facilities and the transportation costs associated with this supervision.

In most of the studies, the total indirect costs of providing PHC were assigned to individual facilities on the basis of their share of total PHC personnel costs. In the Guatemala study, a different and more complex approach was used. There, the indirect costs consisted exclusively of the expenditures of the health area office. On the basis of their perception of the breakdown of their workload, health area officials estimated that 85 percent of the expenditures of the health area office were attributable to PHC facilities. The 85 percent PHC share of the health area office cost was then distributed amongst the health districts comprising the health area on the basis of each district's share of the health area's total population. Within each district, the indirect costs were distributed amongst individual facilities on the basis of each facility's share of the district's total direct costs. Finally, the individual facility's total indirect costs were apportioned to its particular PHC services on the basis of each service's share of the facility's total direct costs.

While unit costs should also include indirect costs, the problems inherent in determining and distributing indirect costs will inevitably yield a considerable range of values depending on the parameters and the methodology selected. In comparing the results of the seven LAC HNS studies, we found that consolidating the indirect costs with the direct costs tended to mask the differences between facilities and services.

Until more effective means of calculating and distributing administrative costs are found, the experience of the LAC HNS studies suggests that indirect costs should be estimated in light of the services they actually support and not as a component of service delivery. As a means of simplifying the process, indirect costs may, in fact, be ignored, with relatively little loss of useful managerial information. In any case, to ensure comparability, separate unit cost figures should be provided for direct costs and for direct costs consolidated with indirect costs.

C. Empirical Findings of the LAC HNS Studies

1. Indirect Costs as a Proportion of Total PHC Costs

The different organizational structures of the Ministries of Health studied, the different ways in which the step-down cost methodology was applied, and the different levels of inefficiency together resulted in markedly different indirect cost estimates for the five country studies. As seen in Table 3 these ranged from 11 percent of total costs in Belize and Bolivia to a very high 45 percent in Paraguay.

TABLE 3
Indirect Costs as a Proportion of Total Direct Costs
LAC HNS Unit Cost Studies*

Country	Indirect Costs as % of Total PHC Costs
Paraguay (2 regions)	45
Nicaragua (includes only the 3 regions which calculated indirect costs)	18
Guatemala (Sololá health area)	13
Bolivia	11
Belize	11

* Data not available for Peru.

2. Composition of the Direct Costs of PHC

In light of the wide variation in the indirect costs methods and measures, the studies' unit cost estimates are more comparable when they include only the direct costs of PHC service provision.

Table 4 contains the composition of the direct costs of providing all primary health care services by type of facility. It is perhaps not surprising that in the two studies which assumed that the supply of medicines available was sufficient to dispense medicines in accordance with MOH treatment norms--Nicaragua and Bolivia--the share of medicines of total costs was significantly higher than in the other countries.

TABLE 4
Composition of Primary Health Care Expenditures

A. Health Centers

<u>Country/District</u>	<u>Period</u>	<u>Percent of Total Expenditures</u>			<u>Total</u>
		<u>Pers.</u>	<u>Drugs*</u>	<u>Other</u>	
BOLIVIA					
Altiplano Sur	10-12/1990	46%	5%	49%	100%
Altiplano Sur	7-9/1991	43%	14%	44%	100%
Valles Cruceños	10-12/1990	45%	19%	37%	100%
Valles Cruceños	7-9/1991	44%	20%	36%	100%
GUATEMALA					
Sololá	1-12/1989	94%	3%	3%	100%
PERU					
Lambayeque	10-12/1990	19%			
Lambayeque	10-12/1991	88%			
Lima Sur	10-12/1990	44%			
Lima Sur	10-12/1991	63%			
NICARAGUA					
Granada	1-9/1991	42%	32%	26%	100%
León	1-9/1991	33%	35%	33%	100%
Matagalpa	1-6/1992	61%	17%	23%	100%
Jinotega	1-6/1992	60%	33%	7%	100%
Managua "A"	1-6/1992	58%	26%	17%	100%
Managua "B"	1-6/1992	60%	28%	12%	100%
PARAGUAY					
Cordillera Type 1	1-6/1992	86%	9%	5%	100%
Cordillera Type 2	1-6/1992	85%	8%	7%	100%
Paraguarí Type 1	1-6/1992	88%	8%	4%	100%
Paraguarí Type 2	1-6/1992	88%	8%	4%	100%

*In the Paraguay study, includes both medicines and materials.

TABLE 4, Continued
Composition of Primary Health Care Expenditures

B. Health Posts

<u>Country/District</u>	<u>Period</u>	<u>Percent of Total Expenditures</u>			<u>Total</u>
		<u>Pers.</u>	<u>Drugs*</u>	<u>Other</u>	
BOLIVIA					
Altiplano Sur	10-12/1990	65%	33%	3%	100%
Altiplano Sur	7-9/1991	67%	29%	4%	100%
Valles Cruceños	10-12/1990	50%	15%	36%	100%
Valles Cruceños	7-9/1991	54%	10%	36%	100%
GUATEMALA					
Sololá	1-12/1989	60%	32%	8%	100%
PERU					
Lima Sur	10-12/1990	49%			
Lima Sur	10-12/1991	60%			
NICARAGUA					
Granada	1-9/1991	47%	45%	8%	100%
León	1-9/1991	47%	29%	24%	100%
Matagalpa	1-6/1992	35%	57%	8%	100%
Jinotega	1-6/1992	46%	44%	10%	100%
Managua	1-6/1992	53%	40%	7%	100%
PARAGUAY					
Cordillera Type 1	1-6/1992	77%	12%	11%	100%
Cordillera Type 2	1-6/1992	60%	25%	16%	100%
Paraguarí Type 1	1-6/1992	78%	11%	11%	100%
Paraguarí Type 2	1-6/1992	73%	14%	13%	100%

C. National (Not Facility-specific)

BELIZE	4/1990-3/1991	61%	25%	14%	100%
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*In the Paraguay study, includes both medicines and materials. In Belize, includes all materials and supplies.

3. Units Costs of PHC Activities

Table 5 contains the direct unit cost estimates of the two most comparable PHC services that the studies had in common: general outpatient visits (OPV) and immunizations. The righthand column of Table 5 contains a ratio of the vaccination to outpatient visit unit costs. On average, the studies found that the cost of administering a vaccination in health centers is roughly 40 percent of the cost of an outpatient visit; in health posts, the ratio was around 70 percent. As is evident in the table, however, this ratio varies substantially across countries and even within countries. Even more surprising is that in some instances a vaccination costs more to provide than does an outpatient visit. This may be due to the great variation by country in the content of the outreach visit, but it is also likely to be due to relatively low demand for PHC in general, and particularly for services other than vaccinations.

4. Distribution of Total PHC Expenditures by Type of PHC Service

Table 6 contains the distribution of PHC expenditures by service and type of facility. Two sets of outliers are apparent. In Guatemala nearly one-quarter of all health post expenditures and one-third of health center expenditures are for home visits. The two most comparable service categories in other countries are Bolivia's outreach and Paraguay's health promotion, both of which accounted for less than 10 percent of total expenditures. Nevertheless, without a standard definition for home visits, it is impossible to make any definitive judgments or to develop any policy recommendations.

The second outlier is the proportion of total costs that are devoted to vaccinations in Bolivia. These are very high percentages, especially in the case of the health posts. With 41 percent of the total costs of health posts dedicated to providing vaccinations, it would appear that these facilities do relatively little else, particularly in light of the fact that this study assumed that all required drugs and medicines are available and dispensed.

TABLE 5
Direct Unit Costs of PHC Outpatient Visits and Immunizations
(in constant US\$ of 1993, 4th quarter)

A. Health Centers

<u>Country/District</u>	<u>Period</u>	<u>Vacc.</u>	<u>Outpat. Visits</u>	<u>Vacc/OpV</u>
BOLIVIA				
Altiplano Sur	10-12/1990	2.29	1.82	1.3
Altiplano Sur	7-9/1991	1.39	1.24	1.1
Valles Cruceños	10-12/1990	1.01	1.41	0.7
Valles Cruceños	7-9/1991	0.65	1.29	0.5
GUATEMALA				
Sololá	1-12/1989	0.46	2.18	0.2
PERU				
Lambayeque	10-12/1990	0.62	0.70	0.9
Lambayeque	10-12/1991	1.42	10.37	0.1
Lima Sur	10-12/1990	0.62	0.61	1.0
Lima Sur	10-12/1991	2.52	5.42	0.5
NICARAGUA				
Granada	1-9/1991	0.15	1.29	0.1
León	1-9/1991	0.35	0.99	0.4
Matagalpa	1-6/1992	0.68	1.79	0.4
Jinotega	1-6/1992	0.42	0.83	0.5
Managua "A"	1-6/1992	0.38	1.21	0.3
Managua "B"	1-6/1992	0.62	1.34	0.5
PARAGUAY				
Cordillera Type 1	1-6/1992	1.29	5.05	0.3
Cordillera Type 2	1-6/1992	2.39	6.28	0.4
Paraguarí Type 1	1-6/1992	0.83	3.94	0.2
Paraguarí Type 2	1-6/1992	2.68	4.22	0.6
<hr/>				
UNWEIGHTED MEAN:		1.1	2.7	0.41
WEIGHTED (BY # FACILITIES) MEAN:		1.2	3.2	0.37

TABLE 5, Continued
Direct Unit Costs of PHC Outpatient Visits and Immunizations
(in constant US\$ of 1993, 4th quarter)

B. Health Posts

<u>Country/District</u>	<u>Period</u>	<u>Vacc.</u>	<u>Outpat. Visits</u>	<u>Vacc/OpV</u>
BOLIVIA				
Altiplano Sur	10-12/1990	0.87	1.45	0.6
Altiplano Sur	7-9/1991	1.26	1.49	0.8
Valles Cruceños	10-12/1990	0.57	2.27	0.3
Valles Cruceños	7-9/1991	1.42	2.45	0.6
GUATEMALA				
Sololá	1-12/1989	0.26	0.42	0.6
PERU				
Lima Sur	10-12/1990	0.43	0.78	0.5
Lima Sur	10-12/1991	1.47	4.60	0.3
NICARAGUA				
Granada	1-9/1991	0.25	0.70	0.4
León	1-9/1991	0.40	0.74	0.5
Matagalpa	1-6/1992	0.31	0.40	0.8
Jinotega	1-6/1992	0.67	0.84	0.8
Managua	1-6/1992	0.55	1.02	0.5
PARAGUAY				
Cordillera Type 1	1-6/1992	3.11	5.10	0.6
Cordillera Type 2	1-6/1992	1.15	3.23	0.4
Paraguarí Type 1	1-6/1992	3.53	2.19	1.6
Paraguarí Type 2	1-6/1992	2.15	1.60	1.3
<hr/>				
UNWEIGHTED MEAN:		1.1	1.8	0.61
WEIGHTED (BY # FACILITIES) MEAN:		1.2	1.6	0.75

TABLE 6
Distribution of PHC Expenditures by Service
(in percentages)

NICARAGUA

	General	Maternal	Child	Vacc	Other	Total
Centers	36	13	26	5	21	100
Posts	25	13	42	10	9	100

PARAGUAY

	General	Family Plng	Inpatient Care	Vacc	Minor Surgery	Health Prom	Total
Centers	47	5	20	14	7	7	100
Posts	43	8	14	24	6	4	100

GUATEMALA

	Treatmts	General Care	Respirat Illness	Vacc	Home Visits	ORT	Total
Centers	14	28	5	15	33	5	100
Posts	40	16	3	16	22	3	100

BOLIVIA

	Curative Care	Births	Family Health	Vacc	Out- reach	Other	Total
Centers	22	21	23	25	9	2	100
Posts	33	3	13	41	7	3	100

III. LESSONS LEARNED

In an effort to guide persons interested in conducting their own unit cost study, this chapter reviews the lessons from the LAC HNS primary health care cost analyses vis-a-vis the critical issues that must be addressed in designing and implementing this type of study. Particular emphasis is given to ways to ensure that cost studies are planned and implemented in a manner so as to maximize the interpretability of the findings and to ensure the development of pertinent, practical policy implications.

A. Study Objectives and Target Audience

A single study cannot answer all of the many questions concerning the costs and efficiency with which an MOH provides PHC services. If a study attempts to do too much, it is likely that the study will not address what are perceived as the critical issues with sufficient rigor, thereby reducing the study's usefulness as an instrument for improving the Ministry's efficiency and easing its financial constraints. Other things being equal, the more a study attempts to do, the less specific and the more general its approach.

For example, if the purpose of studying costs is to seriously reduce budgets, a more useful exercise might be to focus on hospitals, which typically command the largest share of resources, rather than on PHC costs. If the objective is to more precisely quantify the proportion of total MOH expenditures which are devoted to primary health care in order to secure a larger portion of total MOH financial resources, then the exercise may be done at a more aggregate level without devoting extensive resources to facility-level data collection. Clearly, a study designed to characterize global budgetary and cost patterns requires a different approach and less detail than a study which seeks to compare unit costs between service delivery facilities.

Alternatively, rather than trying to develop a composite "snapshot" of all of PHC costs, it may be more useful to focus on specific issues which seem to require attention. Those issues might include those services which apparently dominate the service delivery package or to which a large proportion of the resources is devoted.

- ▶ In order to determine the appropriate strategy and detail required for cost studies, it is critical to define *a priori* what it is that the study hopes to accomplish.

A critical part of the definition of study objectives is to define the audience for which the study is intended. Without a specific, identified target audience it is difficult to craft and implement a methodological approach which will provide appropriate information to the intended decision-making level. Part of defining the target audience is to define their range of decision-making authority--i.e., the areas of responsibility over which they exercise some control.

The actions and decisions which individual MOH employees can make which affect the Ministry's costs and services delivery are what may be collectively labeled the individual's

"managerial domain." Managerial domains are determined by a combination of factors: the level and sources of funding; budget development and execution processes, rules and regulations; the prices of inputs; the determinants of prices; the number and type of employees; the determinants of the quantity and mix of personnel; the quantity and quality of services provided; the technology of service provision (i.e., how inputs are combined to produce a service); the level and composition of demand for care, and the organizational structure and norms.

In the case of the most financially important input, personnel, for instance, MOH wages are commonly determined by civil service laws that cover all central government employees, not just those of the Ministry of Health. In that event, wages lie outside of the control of the MOH. Sometimes even the specific number and type of each and every MOH employee (and sometimes even their specific worksite) are also determined by the national legislature. In these instances, the determination of the number and mix of personnel is an issue that lies outside of the MOH's managerial domain.

The managerial domain of facility-level MOH personnel is typically restricted to only one possible means for improving operational efficiency: decreasing the quantities of inputs required to produce a given level and mix of services. Possible approaches to changing input quantities are: (1) (where demand is inadequately addressed) improve the average productivity of inputs, using the same production processes (e.g., by changing incentives for MOH providers), or (2) change the production processes so as to enable using relatively more inputs which are less expensive and relatively fewer inputs which are more expensive (e.g., by substituting nurses for physicians in providing, for instance, family planning follow-up visits or well-baby check-ups).

However, unless personnel time is a constraint in the provision of care (i.e., limits the quantity of any type of service provided), or unless the quantity and composition of staffing is within the control of the facility or the MOH, increasing the productivity of inputs in producing a particular service will not result in enhanced overall productivity or efficiency. It may reduce average costs of a particular service type, but if there is no way to use the freed-up staff time to expand service provision, or if the reduction in staffing requirements cannot be translated into reduced full time equivalent positions, these actions just increase the down-time of staff and result in no real savings.

At the facility level, the same is commonly true of many other inputs, as well. This is the case, for example, when facility personnel have little or no say in the quantity of inputs their facility receives: the quantity they receive is the result of decisions made by higher level (regional or central office) officials. In this case, these inputs lie outside the managerial domain of the facility level personnel, but within that of the higher level (regional or central office) personnel.

Defining managerial domain requires knowledge about how and where key resource allocation decisions (e.g., assignment of personnel, determination of availability and prices of drugs) are made, beginning at the central level down to the facility level. Understanding what the domain of managers consists of, and the factors that shape that domain is fundamental to determining the type of analytic approach to take, the appropriate level of specificity for each tier of

decision-maker, and what, if anything, can be done about the variations in average costs identified by applying the methodology.

Although cost analysis can be useful to provide some concrete, quantifiable examples of how reliance on existing resource allocation methods debases efficiency, one is oftentimes likely to be able to demonstrate the same point without undertaking the considerable expenditure of resources and devoting the substantial time required by a facility-specific unit cost study. Whether or not a unit cost study is warranted to demonstrate the outcome of ineffective resource allocation decision-making is the type of decision that cannot easily be made *a priori*. It requires some preliminary, country- and study-specific investigation of contextual factors and the current resource allocation decision-making processes and criteria. In many cases—depending upon the purpose of the study, the target audience and its managerial domain—the best approach may be a combination of (1) identifying and analyzing the processes and criteria of resource allocation decision-making above the health facility level, and (2) performing a unit cost analysis at only the level of the health center and above (i.e., more complex facilities).

- ▶ **To guide study design, the audience for whom the study is intended and their explicit managerial domain should be clearly identified.**

B. Study Design and Methodology

1. Costing Methodology

As was discussed in section II.B.2 above, there are three principal methodologies for estimating costs:

- (1) Measuring the actual quantities of the resources used to produce a particular good or service and the prices of those resources;
- (2) relying upon available accounting-based expenditure data to estimate the value of resources used to produce a good or service; and
- (3) multivariate statistical analysis to estimate a cost function.

Regardless of which of these approaches is used, cost studies generally are characterized by two serious shortcomings: the inability to take into account variations in either (1) the quality of care or (2) the mix of services provided (or alternatively viewed, the mix and severity of illnesses treated).

In the interest of reducing the time and cost of the studies, all of the LAC HNS studies relied to a significant, though varying, extent on budgetary expenditures to proxy costs, rather than directly measuring the level of resources actually used (i.e., real costs). While this is a useful approach for ensuring the accountability of resources, it is far less useful as a method by which to gain an understanding of how well resources are used, or how well they could have been

used. Using expenditures to proxy costs assumes that the level of resources appropriated and expended was the level of resources required to produce the level and mix of services provided: what was spent was implicitly equated with what it should have cost. The expenditures approach does not provide insight into how average or total costs might be changed if the prices or quantities of inputs, or the mix of outputs is changed.

Reliance on budgetary expenditures as an approximation of real costs can be problematic for several reasons. First, using budget data rather than actual resource use, in general, results in unit costs and utilization levels being inversely related, particularly when the majority of the costs of service provision are fixed. To the extent that utilization is the factor limiting the quantity of services provided, a critical determinant of efficiency, demand, lies at least in part outside of the control of the facility manager. Interpretation must take these factors into account.

The only way in which expenditure analysis sheds some light on efficiency is if there are significant variations in the average cost of producing services. Even then, however, given the importance of exogenous factors--like demand--in determining average cost, one cannot rush to judgment on how inefficient a particular facility is, or how inefficiently a particular service is being provided, just by the relative magnitude of average cost. The latter must be complemented by information about the quality of care, the adequacy of the resources provided, and the kind of managerial decisions that were involved in the process.

In order to simplify and economize the LAC HNS studies, various assumptions (which varied by study) regarding the use of different inputs were made which complicate interpretation. Many of the studies adopted one or more rules for estimating the amount of one of the inputs used to produce services, without actually measuring resource use. By construction, these conventions assumed away the possibility that the particular inputs were an important source of variation in the cost of services, independent of the quantity of services provided.

For example, the assumption in the Bolivian and Nicaraguan studies that the quantities and values of drugs distributed to and dispensed by the facilities were exactly those specified by treatment norms simply "assumed away" any potential variation across facilities that might have been due to differences in dispensing practices or even availability of drugs. Similarly, the assumption made in the Guatemalan study--that all facilities devote the same proportion of each type of worker's total time to providing a particular type of primary health care service--had the same results.

Since step-down costing does not directly elucidate the extent to which there is or can be substitution across inputs, its usefulness in helping managers to explore the potential for cutting costs by changing input combinations is limited to the variation that may exist in input mixes across facilities studied.

Another problem resulting from using expenditures as proxies for costs is that reductions in budgets are likely to be interpreted as reductions in costs--i.e., improvements in efficiency--

which may or may not be the case. Particularly when there are inadequate controls for case mix and the quality of services provided, as is the case in all of the studies analyzed here, equating a reduction in budget expenditures with improvement in the efficiency in service delivery is likely to be misleading. Indeed, in many cases just the opposite may be true, that is, falling budget expenditures are very likely to mean deterioration in the quality of services and/or a reduction in the efficiency of services being provided.

- ▶ **The costing methodology selected must be based on the study's objectives, target audience and resources available. Regardless of the approach selected, it is important to recognize and to explicitly identify and discuss the shortcomings of the method chosen and their implications in interpreting the findings of the cost analysis.**

2. Contextual Factors

Like any dynamic organization, health systems function in a constantly changing world: disease patterns change, personnel are constantly changing, budgets fluctuate, and equally as important, the economic and social context in which health services are delivered may change. Political instability may lead to important changes. Even the weather (as in the case of floods and droughts) may lead to changes. These changes may render comparisons between time periods useless.

The importance of this lesson was dramatically illustrated in the second Peru study which attempted to compare unit prices for services between 1990 and 1991. The intervening period was marked by severe political turbulence, hyperinflation, strikes, and the doubling of salaries for health personnel, and drastic reduction in demand for services. It was not, therefore, surprising that unit costs for services more than doubled during the period, rendering cost comparisons meaningless. Because many of the countries studied were in the throes of severe politico-socioeconomic and, in some cases, institutional crises during the periods of analysis, the validity of the cost estimates derived is subject to questions about how these conditions might have affected the cost estimates.

Moreover, there are number of factors which are characteristic of the functioning of most Latin American countries' Ministries of Health which have important efficiency implications and therefore should be documented so that they may be taken into consideration during analysis of the results of cost studies. These include MOH norms about health care provision schedules; discrepancies between the hours physicians are contracted for and the hours typically worked; reliance on vertical delivery systems for certain services; and the existence of multiple drug and medical supplies purchasing and distribution systems.

- ▶ **The study design should identify the role and significance of critical contextual factors; in the event of significant changes in these factors during the study period which eliminate the basis for comparison, the design should be modified accordingly.**

3. Understanding Resource Allocation Processes

An implicit assumption of the LAC HNS studies was that efficiency could be best investigated by understanding the cost of the various PHC services provided in different facilities. The average cost of PHC services may be viewed as the outcome of applying resource allocation criteria together with other resource allocation processes. This outcome approach to measuring managerial performance may be contrasted with a *process* approach, which seeks to understand the processes involved in making resource allocation decision--i.e., the constraints, limitations, parameters, opportunities and incentives influencing managerial performance at different levels within the MOH. These contextual factors can only be determined through participatory interpretation involving actors at each level of the system.

Efficiency is a resource allocation issue. The heart of the analysis should be a description of the resource allocation criteria and processes, since ultimately it is these very criteria and processes that the study is striving to evaluate and to change. If the goal of the cost studies is to evaluate managerial performance and to identify means for improving the efficiency of service provision, then the logical starting point for determining how they might do so is with an understanding of the current processes and criteria.

How efficiently a particular health care facility provides PHC services depends on what resources the facility has and how it uses those resources. Without on-site interpretation, cost studies become too narrowly focussed on devising the tool by which to measure efficiency--that is, they become overly preoccupied with the calculation of average costs--and lose sight of the ultimate objective, namely improving the efficiency of the MOH.

- **The study design should include examination of resource allocation processes as well as outcome measures like average unit costs.**

4. Selection of Study Facilities

The selection of the facilities to be studied is a critical part of the design if the objectives of a cost study are to be met. The LAC HNS studies yielded several lessons in this regard.

First, if the purpose of the study is to generalize the findings from a particular sample, it is important to know how representative the sample of facilities under study is in order to gauge the generalizability of the study's results. Furthermore, the sample sizes must be sufficiently large to avoid suspicion of being subjected to substantial random variations, or otherwise not being representative.

Second, for the comparisons to be meaningful, health centers of a given complexity should be compared with others of the same complexity. The same applies to health posts. It is important to remember that the mere title of health post or center may not adequately describe the appropriate category of a facility. As a means of better categorizing facilities, the LAC HNS

team in Paraguay developed a weighing methodology which was relatively simple to perform. Annex 1 provides a detailed description of this categorization process.

- **The health service facilities studied should be comparable in terms of the number and type of staff, the complexity of services offered, and preferably the size of the population served.**

One of the problems encountered in the LAC HNS studies was the sheer volume of data collected. This slowed down the data processing and analysis significantly, delaying the presentation of results and effectively weakening the studies' utility. As was seen in Table 1, in most of the studies, more than half of the facilities included in the analysis were health posts. Thus, their elimination would have halved the amount of data collected and analyzed.

Health posts are, by definition, small facilities, usually run by only one or two people. Even though costs can be estimated for the services they provide, that information does not provide much help managerially: tasks cannot be redistributed to other personnel; personnel probably cannot be added or eliminated; and the mix of services is probably a fairly basic, standard package. Furthermore, the overall costs are relatively insignificant. For these reasons,

- **In order to reduce the volume of data, recurrent cost studies should focus primarily on health centers and/or facilities of higher complexity. Health posts should be added only when sufficient capacity exists to gather and process the data rapidly.**

5. Performance and Capacity Benchmarks

The absolute level of the average cost of a health service is not necessarily useful information in and of itself. While cost analyses provide information about the degree of variation in levels of efficiency within the health care system, they do not address what, if anything, should be done about these variations. Costs are not only affected by efficiency, but also by the demand and potential demand for services, quality of care, and the mix of services themselves. What is useful, therefore, is to compare the costs of services between delivery units and to try to explain the differences found.

For example, the existence of lower unit costs does not necessarily imply a better product: the quality of the lower-priced service may not be of an acceptable level. Furthermore, in order to expand coverage, some facilities will inevitably serve smaller populations and therefore always show a higher unit cost for services.

Although it is possible to compare the performance of individual study facilities and thereby target those that are performing relatively poorly for some type of follow-up, without benchmarks of some kind, no insights can be provided as to the adequacy of performance.

The LAC HNS studies' basic approach to applying the methodology did not identify a single facility as an example of a well-supplied and well-functioning facility to serve as a benchmark against which to measure the performance of the other study facilities. Such facilities could serve as a reference point against which to assess the adequacy of MOH financing or the study facilities' performance. Although it is possible to compare the individual study facilities' performances to one another, and thereby flag those that are performing relatively poorly for some type of follow-up analysis, no insights are provided into whether or not the better performing facilities are doing "well enough."

The lack of service provision capacity benchmarks also precludes being able to assess the stability of the unit cost estimates as a facility's output level changes. The step-down cost methodology provides a single point estimate of unit costs. How sensitive are the single point unit cost estimates likely to be to changes in the level of demand for PHC services? If demand increases or decreases from the observed level, is it likely to increase or reduce the estimated unit costs? And, if so, by how much?

For example, if the expected or desired level of output of the facility were such that it did not exceed or did not greatly exceed the estimated capacity of the service or facility, then the cost estimates developed from analysis of the facility at its current service provision level would provide a reasonable estimate of the cost of expanding the facility's output. If, however, due to low demand, the current output of the facility is small relative to its potential capacity level, it may be that the unit costs of the facility would be reduced as output increased. In the short run, some costs, e.g., personnel, do not change as the level of service provision or output changes. These are called fixed costs. Other costs, such as drugs and medical supplies, increase or decrease as the quantity of services provided increases or decreases. These costs are labeled variable costs. If a facility has excess capacity, expansion of the current level of output could reduce average fixed costs enough so as to offset any increase in average variable costs and result in a reduction in average total costs.

In other words, there are two different types of costs: measured costs and costs at full capacity. With the fixed costs of personnel constituting a large proportion of the total cost of PHC services, measured cost and cost at full capacity are likely to vary dramatically. Therefore, for interpretative purposes, it is imperative to gauge how sensitive unit cost estimates are to changes in the facilities' service provision totals. In other words, it is important to assess the extent to which the unit costs estimated may be a reflection of the particular level of functioning at which they were studied.

- ▶ A single facility of each type should be identified as an example of a well-supplied and well-functioning facility to serve as a benchmark against which to measure the performance of other study facilities.

C. Data Collection and Analysis

1. Resource Allocation Rules

Whenever possible, procedures used in a cost study to measure actual resource use should utilize existing criteria of the MOH rather than creating a substitute, since it is precisely these criteria that the efficiency analysis is attempting to understand, evaluate and improve.

The LAC HNS Guatemala study posited that 92.5 percent of the value of drugs is used in providing "treatments." Although the distribution of drugs did not vary across health posts in the Sololá health district, the provision of treatments did, and markedly. As a result, the variation in the value of drugs actually dispensed probably varied considerably, but was undetected by the cost study methodology.

While distribution of drugs on the basis of standard packages may facilitate drug allocation decision-making for some central or regional level MOH officials, it does so at the expense of creating marked inequities in the availability of drugs and inefficiencies in the use of resources. By allocating too many drugs to some facilities and too few to others, this resource allocation rule may well result in adverse consequences for the quality of health care.

- ▶ **Where they exist, rely upon existing MOH resource allocation rules rather than devising substitutes; at the same time, the study should assess the impact of these rules on actual and potential efficiency.**

2. Dealing with Inflation

Inflation can have a serious impact on costs, and must be adjusted for in order to make the correct interpretations. The approach taken in all of the LAC HNS studies to control for inflation was to use the consumer price index (CPI). The CPI, however, is not likely to do an acceptable job of accounting for the true impact of inflation on the MOH. The CPI is an index of price changes based on the weighted average of prices changes which occur in a basket of goods and services purchased by the "typical" consumer of the particular country in question. The composition of the basket of goods and services the typical consumer is likely to purchase is likely to vary substantially from that purchased by a Ministry of Health.

The use of the CPI is likely to significantly over-adjust for the impact of inflation on the purchasing power of the MOH budget. This is because 50 to 70 percent of many countries' MOH budget are devoted to personnel, and salaries probably grow considerably more slowly than the CPI. Accordingly, MOH expenditures should be broken down into two components: one that consists of just salaries and a second that includes everything else. A salary-adjustment index can be assembled with the data on each of the most common positions and used to deflate salaries. In most MOHs, the most common five or six job categories generally account for 80 percent of total MOH employees. The remainder of expenditures could then be deflated by the

CPI. This relatively simple two-step approach would provide a more accurate accounting of the impact of inflation and thus of the longer term trends of the real level of MOH financing.

- ▶ **An MOH-specific price index should be constructed and used to derive "real" expenditure levels rather than relying on the overall consumer price index.**

3. Sensitivity Analysis

It is important to assess how sensitive the unit costs estimates are to modifications in these assumptions. For example, one important question for the LAC HNS Nicaragua and Bolivia studies is: What would the costs of PHC services be in these two countries be if instead of assuming that 100 percent of drugs recommended by MOH treatment norms medicines were dispensed, only 50 percent or 25 percent were dispensed? To establish that unit cost estimates are adequately stable (i.e., valid and reliable), sensitivity analysis should be conducted of the major assumptions made in applying the step-down cost analysis.

- ▶ **The study should perform sensitivity analysis to assess the significance of key assumptions.**

D. Presentation and Utilization of Findings

Most decision-makers in the health field are medical personnel who are both unaccustomed and uninterested in analyzing vast quantities of financial information. Furthermore, even if this were not true, busy decision-makers probably don't have time to thoroughly analyze the data generated by studies as large as those carried out by LAC HNS. Language is also important: most audiences are not professional economists, and while some effort must be made to familiarize them with the basic concepts of costing, too much technical jargon is likely to cause rejection of study findings. For this reason, the design of the study should carefully consider how the data analysis will be summarized in a form that makes the findings most accessible to decision-makers.

One of the weaknesses of the LAC HNS studies was the delay between the end of the study period and the actual presentation of the results. To be of maximum value as a managerial tool, cost data should be presented relatively quickly. Accomplishing this goal may require, in turn, that the scope of the study be narrowed in order to ensure that the results can be obtained in a timely way.

- ▶ **Data should be summarized and presented graphically to attract the interest of the people responsible for their utilization. Technical jargon should be avoided. To be most useful, recurrent cost studies should be planned so as to minimize the time span between data collection and presentation of results.**

Without adequate interpretation, the results generated by cost studies have limited usefulness. At minimum, the most marked of the variations in costs should be pointed out for discussion and

further analysis by MOH personnel who are in a position to do something about the concerns raised--i.e., the key actors in resource allocation decisionmaking. Undertaking a cost analysis at the facility level and finding large variations in costs across several facilities does not necessarily imply that solutions can be found by health facility staff alone. It is very likely that all or nearly all of the resource allocation decisions are made at organizational levels above the facility, and that the facility is a generally passive agent in the management of most of its resources. Nevertheless, facility-level staff should be included in the presentation of findings in order to sensitize them to cost and resource allocation concerns.

The LAC HNS studies found that the most receptive level for linking cost results with action to address potential efficiency problems was the regional and/or area levels, which in many countries undergoing decentralization processes, are being invested with increased authority over the management of resources. In Guatemala, the unit cost results were used at the health area level and in Nicaragua at the local health system (SILAIS) level to identify facilities which seemed to be experiencing particular efficiency problems and thus were in need of further examination, and to develop operating budgets which were linked to production of services.

- ▶ **The presentation of findings should focus on identifying when cost variations are significant and who can do what about them.**

Finally, one of the attractions of the step-down costing methodology is that, once the costing approach is developed to fit the circumstances of the country, it can be packaged for routine use by central, regional or local level MOH managers and thereby become an ongoing vehicle for routinely raising concern about, as well as a means for reviewing, performance. Most of the LAC HNS cost study applications directly involved MOH personnel at various levels of the organization, relying upon them to help structure the study and to provide essential data. In Guatemala, the cost study was followed by a series of short-term technical assistance visits which focused on replicating the local level part of the study in three other health areas. A simplified methodology was developed by the LAC HNS team for application at the health area level, where the unit cost information was able to be used in developing newly mandated program-based budgets. It is important to recognize, however, that the institutionalization of the technique requires considerably more resources being devoted to a variety of areas than just the cost study itself, such as information systems development and training.

- ▶ **Efforts should be made to transfer the technology of the cost studies to MOH personnel to enable its institutionalization as a sustainable management tool. Follow-on technical assistance to the study itself is probably necessary to develop a simplified costing approach which can be used routinely by MOH personnel without external assistance.**
- ▶ **It should be noted that while cost-accounting systems may provide relatively accurate cost estimates, they are expensive to maintain. A much more cost-effective procedure for obtaining information is to rely on standard costs for personnel, and obtain drug costs through an inventory control system. In this case approximately 90% of the PHC cost information can be estimated cheaply and relatively accurately.**

IV. CONCLUSIONS

The LAC HNS primary health care recurrent cost studies were an experimental effort to draw attention to efficiency concerns by quantifying the costs of delivering PHC services in a select group of Latin American countries. As such, they were a first generation attempt at refining a practical approach for costing public sector PHC services. The methodological lessons garnered from this experience are thus perhaps as important as the cost findings themselves. As such, they dedicated considerable effort to working out the methodology of costing PHC services and in so doing, generated important lessons about how to improve such endeavors in the future.

The primary limitations of the methodology applied in the LAC HNS studies were that, by attempting to provide a broad picture of PHC costs and suggest areas of inefficiency, the studies did not, in most cases, generate enough specific information that would enable program managers to take concrete actions to improve the efficiency of service delivery. By virtue of their not having adequately examined the contextual issues which largely determine the possibilities of action to address inefficiencies detected, and by paying inadequate attention to the development of the policy implications of the findings of the efficiency analysis with respect to these issues, the LAC HNS studies often did not lead to concrete action at the operational level.

The exceptions were the country studies in Guatemala, Nicaragua and Paraguay, all of which focused considerable attention on a sub-national level (in Guatemala, the health area level; in Nicaragua, the local health system or SILAIS level; in Paraguay, the regional level) and worked with local officials to interpret the findings and suggest implications for regional or area management decisions. In the Guatemala Sololá health area the SILAIS level in Nicaragua and the two study regions in Paraguay, where decentralized levels in each country had recently been invested with increased authority over the allocation of resources—the LAC HNS study team worked with local officials in using the cost information for budgeting and planning purposes.

The LAC HNS experience showed that it is not enough to present data to sensitize central level officials to cost issues. Rather, such information can best be used at operational levels and requires follow-up to the presentation of data to assist local officials in putting the information to practical use. The studies found that the provision of cost, efficiency and productivity information are necessary but not sufficient conditions for improving the managerial performance of the MOH. People also have to know what to do with the information, and have an opportunity and the appropriate incentives for using the information.

Finally, one of the original objectives of the LAC HNS studies was to provide a basis for international comparisons of unit costs of specific primary care services. It was hoped that a synthesis would produce, among other things, specific suggestions for minimal PHC funding levels, the optimal mix of health care services, and methods for enhancing the efficiency with which different, specific PHC services and, more generally, for enhancing the efficiency of the operations of the Ministry of Health. Unfortunately, differences in the countries' definitions of

PHC and availability of expenditure data, and the variations in how the step-down costing approach could be applied in each country precluded being able to do so.

Each of the studies focused (appropriately) on local priorities and was to a considerable degree limited by the existing data sources. As a result, only two services even approached comparability across all of the countries: immunizations and outpatient consultations. Even if it is known if a specific category includes a particular type of activity, the heterogenous nature of the more comprehensive categories precludes being able to make meaningful comparisons. For example, while "consultations" is a single category in some countries, in others there are a number of distinct categories of specific types of consultations. Thus the single all-inclusive category homogenizes the cost of the separate consultation categories which include activities as disparate in nature and costs as birth/delivery and growth monitoring. Efforts to develop weighing schemes to try to combine some of these service types and thus enhance the comparability of different studies were unsuccessful.

The rudimentary state of the art of PHC cost analysis, as measured by these seven studies, together with the various non-comparable aspects of these studies, militated against combining the results of the studies to attempt meaningful international comparisons.

The World Bank is now promoting the use of recurrent cost studies as a step toward costing packages of basic health services. The LAC HNS experience suggests that such studies are most useful if kept focused on a few limited objectives, with immediate applications planned for the data generated and follow-up technical assistance to help national and local officials interpret and apply the findings. The studies also underscore the importance of examining the contextual factors and resource allocation decision-making processes which largely determine variations in costs.

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ANNEX 1

Methodology Used in Paraguay to Categorize PHC Facilities

In order to better ensure that the facilities selected for the Paraguay recurrent cost study were placed in comparable categories, the team devised a weighing methodology described by the following factors:

	Points Awarded Within Each Category	Weighing Applied To The Total
Number of Personnel	100	8.0
< 5	30	2.4
6 - 10	50	4.0
11 - 15	75	6.0
> 15	100	8.0
Technical Level of the Personnel	100	72.0
Physician	25	18.0
Trained Midwife	20	14.0
Nursing Personnel	20	14.0
Other Technical Personnel	5	3.6
Security Guard (24 hours)	10	7.2
Physical Infrastructure	100	20.0
Beds	15	3.0
Delivery Room	20	4.0
Instruments	10	3.0
Cold Chain	20	4.0
Electricity	10	2.0
Water	15	3.0
Communications	10	2.0

As can be seen from the weighings, the dominant factor considered was the technical level of the personnel, which received 72 percent of the total weighing. The presence of a doctor added 18 points to the facilities score; a nurse, 14 points; and so on.

The facilities were rated and grouped according to their total score:

Health Centers - Type 1	> 90 points
Health Centers - Type 2	70 - 89 Points
Health Posts - Type 1	40 - 69 Points
Health Posts - Type 2	1 - 39 Points

The factors considered and the weights used in Paraguay could easily be tailored to fit the situation in other countries.